No. 772,589. PATENTED OCT. 18, 1904.

R. TONGE & J. BUTTERWORTH.

STEAM TRAP.

APPLICATION FILED JUNE 19, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

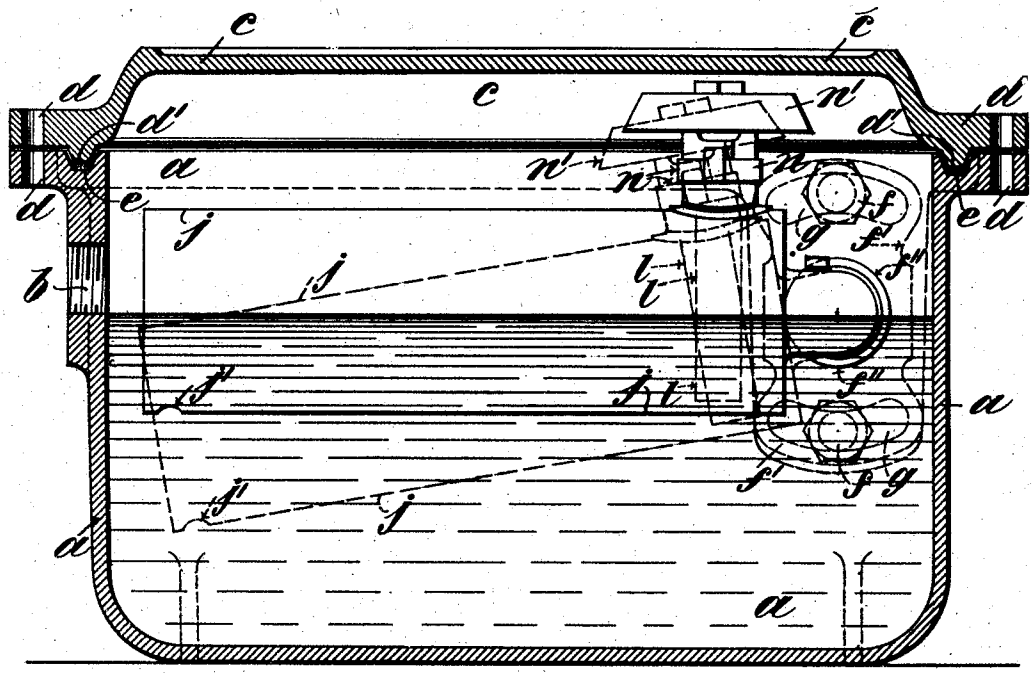
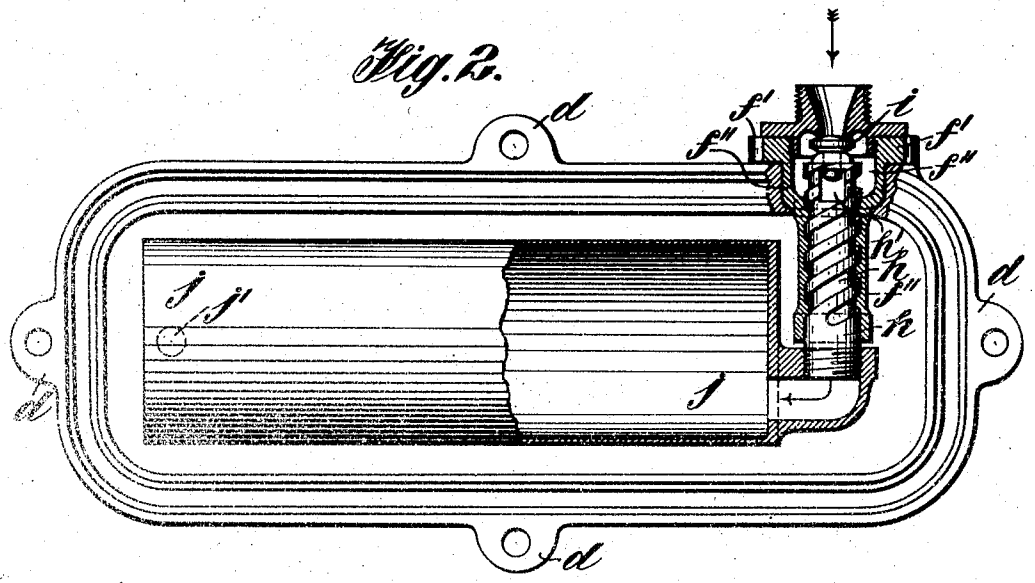


Fig. 1.

Fig. 2.



Witnesses.
William A. Colebourn
Mabel Lee.

Inventors.
Richard Tonge
Joseph Butterworth
By William B. Taylor
Atty.

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NO MODEL. 2 SHEETS—SHEET 2.

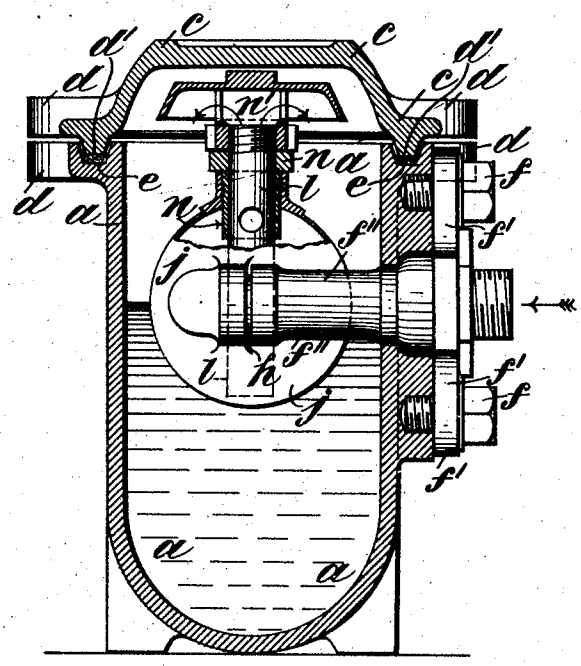



Fig. 3.

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# UNITED STATES PATENT OFFICE.

RICHARD TONGE AND JOSEPH BUTTERWORTH, OF PENDLETON, NEAR MANCHESTER, ENGLAND.

## STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 772,589, dated October 18, 1904.

Application filed June 19, 1903. Serial No. 162,286. (No model.)

*To all whom it may concern:*

Be it known that we, RICHARD TONGE and JOSEPH BUTTERWORTH, engineers, of the firm of Lancaster and Tonge, Limited, subjects of the King of Great Britain and Ireland, residing at Withington street, Pendleton, near Manchester, in the county of Lancaster, England, (post-office address as above,) have invented certain new and useful Improvements in Steam-Traps, of which the following is a specification.

This invention relates to improvements in steam-traps for draining away the water of condensation from vessels or pipes, and more particularly relates to the class of steam-trap provided with a float-valve consisting of a hollow arm and ball, through which the water of condensation can pass into the cistern or tank in which the ball is mounted, a further feature of such traps being the use of a hollow quick-threaded screw adapted to operate a small valve either to allow the water of condensation to pass into the ball or to shut off steam therefrom, as required.

Our invention consists, essentially, in dispensing with the spherical hollow float located at the end of a hollow arm and substituting therefor an elongated or somewhat cylindrical float which practically occupies the whole of the space between the valve and the end of the cistern of the trap and in mounting the water-discharge pipe near the valve end of the float.

Our invention will be fully described with reference to the accompanying drawings, in which—

Figure 1 shows a longitudinal sectional elevation of the steam-trap constructed in accordance with our invention; Fig. 2, a plan of same, partly in section; and Fig. 3 an end elevation, also partly in section.

Referring to the drawings, *a* indicates the cistern or tank of the trap adapted to receive the water of condensation from a vessel, range of steam-pipes, or the like, which can be drained away through the outlet *b*.

*c* is a cover for the vessel, that may, if required, be securely held in place by bolts passed through the snugs *d*, a lip *d'* being formed on the cover adapted to pass into a hollow groove *e* in the body *a* of the trap. At a convenient point in the cistern or tank *a* is fixed, by means of bolts or set-screws *f*, a bracket *f'*, capable of being moved about its center by the aid of slots *g*. The bracket *f'* is provided with a hollow boss chased internally with a quick-threaded screw and having an open passage-way direct from the range of steam-pipes, vessel, or the like to be drained. In connection with the hollow screwed boss we employ a hollow spindle *h*, chased externally with a screw-thread corresponding with those in the boss. The spindle *h* is provided with a passage-way *h'*, and in its end is located a loose valve *i*, adapted to be forced against a seating in the hollow boss *f''* by the ascent of the float or to be withdrawn from the seating by the descent of the float. The screwed spindle *h* forms part of or is attached to the float *j*, so that it can partake of the movements of the latter. It is a characteristic feature of our invention that the float *j* instead of being spherical and connected to the spindle *h* by a hollow tubular extension is itself made in the form of a cylinder, as shown, or an elongated hollow chamber made as large as convenient to operate freely within the tank or cistern *a*, in which it is located. We preferably make the float in the form of a cylinder, as indicated in the drawings, and by doing so we obtain a vastly-increased buoyancy over the spherical float previously employed, which is much smaller and only occupies a portion of the available space in the cistern. At the free end of the elongated float we provide a hole *j'*, adapted to allow water from the cistern *a* to enter the float.

Another feature of our invention consists in placing the water-discharge pipe *l* near to the point at which the float is pivoted, so that the float will readily lift when steam enters therein to discharge the water, as is well understood. This discharge-pipe is of the usual construction—that is to say, its open end extends near to the bottom of the float, while its upper end is provided with an adjustable air-valve *n*, adapted to pass off any air or steam which may reëvaporate from

the water entering the float, so as to keep the trap in action until the whole of the water of condensation has been drained away. The valve $n$ is controlled as to the amount of orifice open by turning the conical deflector $n'$.

The action of the trap is as follows: Water from the vessel, range of steam-pipes, or the like to be drained passes through the hollow boss $f''$, the float $j$ being more or less in the position indicated by the broken lines in Fig. 1. It continues so to flow through the passage-way $h'$ and spindle $h$ into the float $j$, up through the pipe $l$ and out at its top end beneath the deflector $n'$, and so into the cistern $a$. The float $j$ becomes water-logged, but immediately steam passes into the float $j$ in the direction indicated the water is forced out through the pipe $l$, so rendering the float buoyant. Immediately this occurs the float rises more or less to the position indicated by the full lines in Fig. 1, and thereby closes the valve $i$ against its seat, preventing further access of steam. While water of condensation again collects, the float becomes water-logged by water entering at $j'$ and the cycle of operations is repeated, as will be well understood by those skilled in the art to which our invention relates.

We would have it distinctly understood that the form of valve and discharge-pipe arrangements is well known; but

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a steam-trap, a suitable receptacle, a bracket projecting through the wall of the receptacle, means for adjusting the bracket, a hollow boss extending inwardly from the bracket, a hollow spindle threaded in the hollow boss and having a valve on its outer end controlling the passage, an elongated hollow float connected to the hollow boss and adapted to actuate the said boss, a pipe depending into the said float, and a deflector on the end of said pipe, substantially as described.

2. In a steam-trap, a suitable receptacle, a bracket projecting through the wall of the receptacle, means for adjusting the bracket, a hollow, boss extending inwardly from the bracket, a hollow spindle, threaded in the hollow boss, and having a valve on its outer end controlling the passage, an elongated hollow float connected to the hollow boss and adapted to actuate the said boss, a pipe depending into said float, a valve and conical deflector on the end of said pipe.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

RICHARD TONGE.
JOSEPH BUTTERWORTH.

Witnesses:
WILLIAM H. TAYLOR,
JAS. STEWART BROADFOOT.